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theory would demand is indicated in fig. 5 (Plate 22), where the system *RR Centauri* is delineated, and also the theoretical dumb-bell figure of equilibrium taken from Darwin's well-known charts, *Phil. Trans.* 1887, A, Plate 22, fig. 2.

6. The variable *RR Centauri* because of its inclination to the plane of sight, and consequent narrow range of variation, does not lend itself readily to investigations such as the present.

It is certain that more assured and more definite results would be, indeed have been, secured with stars moving practically at right angles to the tangent plane.

It seems to me reasonable, however, to take an example of more than ordinary difficulty as evidence of the possibility of pushing the observations of *Algol* variables to their legitimate issue.

Lovedale, S. Africa: 1903 *April.*

The National Argentine Observatory. By Dr. J. M. Thome.

(*Communicated by the Astronomer Royal.*)

During the sessions of the International Congress at the end of 1900 July the photographic zone comprised between the 23rd and 31st degrees of south declination, which had originally been assigned to the observatory of the province of Buenos Aires at La Plata, but which had lapsed on account of non-compliance, was by a unanimous vote transferred to the National Observatory of the Argentine Republic; and I at once contracted with M. Gautier, the maker of the Paris telescope, for a similar instrument, with lenses by the celebrated Henry Brothers, from discs by M. Mantois; and also a measuring machine by the same maker, a sidereal clock by Fenon, two réseaus, and various other accessories.

The boxes containing the instruments arrived in Cordoba at the beginning of 1902 January; and, the piers having been erected previously, the telescope was installed and ready for work by the end of that month; but, unfortunately, the Lumière plates, which I had ordered to be sent with the boxes containing the instruments, had been forgotten, and did not arrive before the end of April. These were then found to be 161 mm. square instead of 160 mm., and this being the extreme limit of the Gautier measuring machine they could not be used as catalogue plates, and, moreover, a large proportion of them were fogged. I had, also, when ordering our réseaus, ventured to change the present order of numbering the lines to one in which the numbering should begin with the lines which cross at the centre of the plate and increase both ways; but the maker interchanged

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the legends indicating the positive and negative abscissas and ordinates, and the réseau was therefore unsuitable for the charts.

After another long delay we received a gross of plates—of the proper dimensions this time—but, most unfortunately, the réseau did not conform with the focal length of our objective, being in error by more than one millimetre in 60. With this my attempts at introducing the new réseau ended, and we had recourse to the spare one in which the lines are numbered as originally, and have used it ever since. We soon found that the plates showed varying inclinations, not being true squares; and we now always examine every plate to find the two adjacent sides which fulfil the requirements, and mark that angle before putting the plate into the holder.

The present interruptions to the work are caused almost exclusively by the Moon and bad weather. In September there was only one, in October three, and in November and December, each, two possible nights for photography. The weather has, indeed, been phenomenally bad throughout the year, there being only 173 possible nights (122 long ones) for meridian work against an average of 189 since 1890, and 270 during the first fifteen years of the existence of the Observatory. The remarkable transparency of the atmosphere has also disappeared since this region has been under irrigation, and the occasions upon which we can photograph 11th magnitude stars with 6^m exposures, owing to their inconstant light, are very rare; we generally give from 7^m to 8^m, and even 10^m, upon dull nights. After midnight there are frequently heavy dews which interrupt the work; and, upon some occasions, after a day of high winds and dust, we have found the lenses entirely covered with a fine dust at the end of the night, although nothing unusual was perceptible to the senses, and the nights were perfectly calm and apparently good ones.

Of the 208 plates, mainly short exposures, which we have obtained up to the beginning of April, 196 seem to fulfil the requirements, and of these a considerable number will, no doubt, show stars of the 12th magnitude owing to the uncertainty as to the proper length of exposure. The supposition is based upon the number of stars in our DM. for those regions. I think it will be found that that catalogue contains all the stars to the 10·5 magnitude upon Pickering's scale, and there are undoubtedly some in all the plate regions as faint as, or fainter than, the 11th magnitude, especially in the regions outside the Milky Way. In these regions probably everything to the $10\frac{3}{4}$ magnitude has been recorded—certainly upon the best nights.

I received from the Repsolds in September a Gill measuring machine, which is now also in use. After it had been mounted and adjusted according to Sir David's instructions I noticed a defect in the ratchet motion that carries the plate under the microscope, which threw it out of adjustment whenever the

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motion was reversed by as much as the width of the double wires. I could find no one in Cordoba who was able to correct it, but finally, after a delay of some months, found an instrument maker in Buenos Aires who was able to counteract the rocking motion mechanically without altering any original part, and it now has a uniform and consistent performance in both direct and reverse motions. It affords a rapid, precise, and elegant means of determining the rectangular coordinates.

The reference stars in 23°, 24°, and 25°, from 12 to 15 upon each plate, selected from our DM., have now been observed, at least twice, in each position, circle east and circle west, of the meridian instrument. In the meanwhile I contracted with Bamberg of Berlin for a registering micrometer with clockwork attachment, which will shortly arrive, and I now propose to observe the same stars once more in position circle west. The advantage of being able to bisect an apparently stationary object, no matter what its declination or size of disc, and to record the bisection times upon a chronographic sheet, seems to me very great as compared with the present "chronographic" and "eye-and-ear" transits. I have also increased the dimensions of our meridian room, which was only 3·7 metres long, 4 wide, and 3·1 high, to 16·5 long and 3·6 high. The room now includes the collimator piers and all accessory instruments, clock, chronometers, reversing chair, &c.; and when the new micrometer arrives I confidently hope to improve upon the previous observations of these stars. The number of observations already made is nearly 26,000, and the probable error in the final positions will be about 0″·3.

The reobservations, made in former years, of all the DM. stars to the 9·3 magnitude in the region included between 22 and 37 degrees are still under revision. From a comparison with the positions given by Boss in *A. J.* Nos. 531–532, the probable error of our determinations seems to be ±0″·4.

The DM. zone included between 52° and 62° is under revision—for magnitudes principally. I have adopted Pickering's photometric scale definitely because it seems to me, after long trial, to be essentially correct; and his catalogue gives besides convenient reference belts throughout our sky. I cannot agree with Newcomb that it would have been better to continue the scale used in vols. xvi. and xvii., even supposing that I could have adhered to it consistently, which, as it was not homogeneous, would hardly have been possible. It is besides easy to reduce those magnitudes to the photometric scale, and I have given the approximate corrections in the preface to vol. xviii. p. xx. The reason why I did not estimate to tenths, or even quarter-magnitudes, while observing the stars below 10^m will become perfectly evident to anyone who attempts it with such means as I have; that was, moreover, supposed to be our lowest limit. In the present revision, however, I have done this in part, although it necessitates a great deal of additional work; but it will be

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useful in determining what our lowest limit has really been, and as an indication that the photographic scale can be brought into good accord with the photometric, since the Cordoba and Cape scales agree, for certain plates, throughout the entire range.

The disadvantage under which I labour, in the fact that it is almost impossible to find permanent and reliable assistance here, is very great. I have had many untrustworthy men in my employ; and, in general, the foreigners who come here are true adventurers, who are not to be restrained when a prospect of better remuneration or less work offers; and their substitutes are usually drawn from the same uncertain element. This was not the case during the first period of our existence, when the remuneration was essentially upon a gold basis.

Catalogue of Right Ascensions of 76 Stars. By Robert Snow.

[The following catalogues were presented to the Society many years ago, but were not at the time considered worthy of publication. Dr. Ristenpart, who has undertaken the great work of combining all existing catalogues, on seeing the notes in *Monthly Notices*, iii. p. 99, and iv. p. 143, wrote to ask if these catalogues were still in existence. Search was made in the archives of the Society, and Mr. Snow's catalogues were found and sent (by permission of the Council) to Dr. Ristenpart. In returning them he expressed an opinion in favour of their publication; and the Council on receipt of this valuable opinion directed that the catalogues should be printed in the next following number of the *Monthly Notices*. In preparing them for publication the Editors have omitted from the first Catalogue a column of "extreme differences," and from the second a column of "greatest difference from the mean." Nos. 7 and 34 in the second Catalogue have been bracketed, as they were made with a 20-inch transit. One or two corrections have been pointed out by Dr. Ristenpart: thus the A.S.C. Nos. of 55 and 69 in the second Catalogue are given in the MS. as 1316 and 1609, and the B.A.C. number for No. 17 has been supplied. At the end of each catalogue will be found a list of corrections to the comparisons with other catalogues. It seemed desirable to give these instead of altering the text, as they are the only indication we now have of the general accuracy of the work.]

EDITORS of the *Monthly Notices*.

This catalogue was constructed with a view towards determining how nearly the results of a small instrument, used under disadvantageous circumstances, would approach to those obtained at a first-rate observatory. The instrument employed was a 20-inch transit, mounted upon the usual cast-iron stand, fixed